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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

PERT, EVAN T

ART UNIT PAPER NUMBER

2829

DATE MAILED: 12/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

08/926,592

Applicant(s)

YAMAZAKI, SHUNPEI

Examiner

Evan Pert

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 06 September 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13, 16, 17 and 21-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13, 16, 17 and 21-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 September 1997 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. 06/801,768.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language claim(s) is/are:

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DETAILED ACTION

Response to Arguments

1. Applicant's arguments constitute an unconvincing attempt to establish that Sherman does not teach a "reaction chamber", "first" and "second" electrodes, or that the cleaning gas is not desired to go to either of the inherently "first" and "second" electrodes via pipe(s) 47 and/or 48 [depicted in Sherman's Fig. 4]

Particularly, Sherman teaches a method of cleaning or etching "the (reaction) chamber itself" [col. 5, lines 24-27], teaches a pair of opposing parallel electrodes (call them "first" and "second" or "A" and "B" or any other convenient identifier such as "upper" and "lower" or "top" and "bottom") in an inherently "reaction" chamber 21, and depicts, inherently, both deposition and etching (cleaning) gas bottles connected and configured to deliver gas through either electrode or BOTH, since etch and deposition bottles 46 are all connected to both pipe 47 and 48 inherently configured to deliver gas to and through the upper and lower electrodes [Fig. 4] (unlike applicant who only teaches a configuration introducing gas through one electrode of the pair).

The fact that Sherman inherently teaches etching gas can and should be introduced through either electrode or both is supported by Sherman's statement that the invention applies to "etching the electrodes" [col. 5, line 26] combined with Sherman's depiction of etching gas delivery to EITHER electrode [Fig. 4] as well as the depiction of deposition gas to either electrode. Since deposition gas is designed to flow through either or both electrodes, then it is inherent that the unwanted "deposits" are to

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As applicant's arguments are unconvincing, the original rejection is presented again (with the newly introduced limitation of "providing electrodes" for this RCE considered as being substantially co-extensive in scope with the previous claims' "preparing electrodes" since electrodes inherently can not be "provided" without somehow being "prepared" and electrodes can not be "prepared" without somehow being "provided"):

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 13, 16-17, 21, 23-26 and 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sherman (U.S. Patent 4,563,367).

Claims 13, 16, 17, 21 and 26

As "prior art", Sherman teaches forming layers of insulating materials utilizing a plasma "vapor reaction method", said materials including silicon nitride and silicon oxide [col. 1, lines 16-52]. It would have been obvious to one of ordinary skill in the art, at the time of applicant's claimed invention, to form an interlayer film of silicon oxide with a silicon nitride layer applied for passivation [col. 1, lines 43-45]. Alternatively, one of ordinary skill in art would be motivated to first apply a layer of silicon nitride over transistors formed on a substrate, followed by an oxide interlayer film as was well

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Since the apparatus of Sherman is well suited for deposition of various film materials [source gasses 46, Fig. 4], it would have been obvious to one of ordinary skill in the art to use Sherman's apparatus to form a silicon nitride layer on a silicon oxide layer, or oxide on nitride, depending on the desired application.

One of ordinary skill in the art would motivated to choose silicon oxide for its lower dielectric constant, for example, while being motivated to choose silicon nitride for its superior passivation quality, non-oxidizing quality, or higher dielectric constant.

Regarding the pair of claimed "electrodes", Sherman teaches parallel electrodes 23 and 25a (Fig. 4) that are obviously "prepared within a reaction chamber" since they clearly exist in a reaction chamber as depicted. The substrates are obviously "positioned on electrode 23" so that a surface to be processed faces the upper ("second" or "other") electrode as was known in PECVD at the time of applicant's filing.

Regarding the claimed "introducing" and "exciting" of "first" and "second" film forming gasses, it would have been obvious to "introduce" the gas necessary for the layer being deposited by metering the appropriate source gas 46, motivated by the intended operation of Sherman's apparatus. It would have been obvious to "excite" each of the gasses introduced for vapor deposition as this is the intended mode of operation of the "plasma" in the plasma CVD apparatus of Sherman. Alternatively stated, the steps of "introducing" and "exciting" gasses 46 in the apparatus depicted in Fig. 4 of Sherman are inherent to the operation of the apparatus, the apparatus being a plasma deposition and etching system.

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Regarding the cleaning of unnecessary layers inside the reaction chamber on the walls and electrode, Sherman teaches using nitrogen fluoride to etch away the unwanted deposits [col. 5, lines 10-27].

Regarding the claimed "removing" of the substrate, one of ordinary skill in the art would obviously be motivated to remove the substrate before cleaning; otherwise, the deposited layers of insulating films would be etched from the wafer itself (instead of cleaning only the undesired surfaces inside the reaction chamber).

Claims 23 and 28

Operating Sherman's apparatus to form a film deposit is inherently a plasma CVD process since gasses are vapor reacted in a chamber having a plasma [col. 4, line 66].

Claims 24 and 29

In the apparatus of Sherman, the nitrogen fluoride cleaning gas is inherently "excited" by an RF field, such as 700 watts of RF power [col. 5, lines 32-36].

Claims 25 and 30

As depicted in his Fig. 4, Sherman's apparatus is configured such that all gasses are inherently introduced through the upper electrode manifold 25a, said gas passing through a well-known "plurality of ports".

3. Claims 22 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sherman as applied to claims 21 and 26 above, and further in view of Tanaka et al. (U.S. Patent 4,525,381).

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Tanaka et al. teach an advantage of adding ultraviolet light irradiation to Sherman's apparatus [abstract], which inherently forms a kind of "photo CVD".

It would have been obvious at the time of applicant's invention to modify Sherman's apparatus to include ultraviolet light because, in this way, according to Tanaka et al., "a vapor-deposited film can be formed with high efficiency, because a large quantity of ultraviolet rays can be applied to the substrate without any damage of the vapor-deposited film" [abstract].

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Evan T. Pert whose telephone number is 703-306-5689. The examiner can normally be reached on M-F (7:00-3:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on 703-308-1233. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

ETP
December 2, 2002


EVAN PERT